



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/072,394	02/05/2002	Alfredo M. Morales	SD-8214	4776
7590 03/24/2004				
Timothy Evans MS 9031 Sandia National Laboratories 7011 East Avenue Livermore, CA 94550			EXAMINER MCPHERSON, JOHN A	
			ART UNIT 1756	PAPER NUMBER

DATE MAILED: 03/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/072,394

Applicant(s)

MORALES, ALFREDO M.

Examiner

John A. McPherson

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 2/13/04.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 14-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/26/02.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-13 in the Election filed 2/13/04 is acknowledged.

Claims 14-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Specification

2. The abstract of the disclosure is objected to because the first sentence thereof does not correspond to the invention described in the specification. Specifically, the first sentence of the abstract states the present invention describes a method for fabricating an x-ray mask tool which can achieve pattern features having lateral dimensions of less than 1 micron, however the present specification does not teach or describe an x-ray mask tool, or a method of making the same. As set forth in the title, specification, drawings, claims, and lines 3-12 of the abstract, the present invention is drawn to a silicon micro-mold and a method of making the same. It appears that the first sentence of the abstract is a reference to the subject matter of the parent application, of which the present application is a continuation-in-part. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4-6 and 11-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 4 and 12 each recite the limitations "the step of depositing" and "said metal layer" in line 1. There is insufficient antecedent basis for these limitations in the claims.

Claims 5 and 11 each recite the limitation "the first step of depositing" in line 1. There is insufficient antecedent basis for this limitation in the claims.

Claim 6 recites the limitation "said step of deposition" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 13 recites the limitations "said step of depositing" and "said metal layer" in line 1. There is insufficient antecedent basis for these limitations in the claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over “DEM technique: a new three-dimensional micro fabrication technique for non-silicon materials” by Chen et al. [reference CI of the Information Disclosure Statement filed 2/26/02] (Chen CI) in view of “New type X-ray mask fabricated using inductively coupled plasma deepetching” [reference CL of the Information Disclosure Statement filed 2/26/02] (Chen CL). Chen CI discloses a Deepetching, Electroforming, Microreplication (DEM) technique for micro fabrication comprising sputtering a metallic layer on the backside of a silicon wafer, conducting a silicon deep etching process through the wafer from the front side utilizing a patterned SiO₂ layer as an etching mask to selectively uncover the metallic layer, and electroforming. See the abstract, and “process method B” set forth at page 1101, lines 12-17 and Figure 3. Furthermore, Chen CI refers to Chen CL for a discussion of the deep etching process. See page 1099, lines 6-7 of the Introduction section. However, Chen CI does not disclose patterning the SiO₂ etch mask layer by providing a photoresist layer, and imaging the photoresist layer through a mask.

Chen CI discloses a silicon deep etching process comprising the steps of forming an oxide layer on a silicon wafer, spin-coating a resist on the oxide layer, patterning the resist by photolithography, etching the SiO₂ layer through the resist, and deep etching the silicon wafer through the patterned SiO₂ layer. See the abstract, and section 3 “Fabrication process”. It would have been obvious to one skilled in the requisite art to utilize a photoresist to pattern the SiO₂ layer, as taught by Chen CL, in the process of Chen CI because is taught that spin coating a resist on a SiO₂ layer, imaging the resist,

and etching the SiO₂ layer through the patterned resist provides for a patterned SiO₂ layer useful as a etch mask for anisotropically deep etching an underlying silicon wafer.

Pertinent Prior Art

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


US 6,551,849 discloses a method for fabricating arrays of micro-needles comprising the steps of forming an array pattern on the upper surface of a silicon wafer, etching through openings in the pattern to define micro-needle sized cavities, filling the mold thus formed with electrically conductive material, and etching a desired fraction of the silicon wafer from the bottom.

US 6,242,163 discloses a method of fabricating complex, three-dimensional shapes from layered silicon molds comprising the steps of etching silicon wafers using conventional silicon processing techniques to produce wafers with patterns, stacking and bonding the wafers to form a mold, and filling the mold with a material by electroplating; if necessary, each layer is filled with metal after being bonded to a previously filled layer.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John A. McPherson whose telephone number is (571) 272-1386. The examiner can normally be reached on Monday through Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John A. McPherson
Primary Examiner
Art Unit 1756

JAM
3/18/04